

# The Hebrew University of Jerusalem

Syllabus

# Advanced Course in Optimization and Machine Learning - 67467

*Last update 08-12-2015* 

HU Credits: 2

Degree/Cycle: 2nd degree (Master)

Responsible Department: computer sciences

<u>Academic year:</u> 0

Semester: 2nd Semester

Teaching Languages: Hebrew

<u>Campus:</u> E. Safra

Course/Module Coordinator: Alon Gonen

Coordinator Email: alongnn@cs.huji.ac.il

Coordinator Office Hours:

<u>Teaching Staff:</u>

Mr. Gonen Alon

#### Course/Module description:

We will study modern approaches in optimization while focusing on important applications in Machine Learning.

## Course/Module aims:

1. Getting familiar with families of optimization problems which can be solved efficiently. Understanding the corresponding optimization methods.

2. Understanding the trade-off between computational simplicity and convergence rate.

*3.* Understanding the role of the geometry of the problem. How can we "learn" the geometry?

4. Understanding the role of randomness: sidestepping computational hardness and coping with limited information.

Learning outcomes - On successful completion of this module, students should be able to:

Formulating optimization problems and designing efficient methods for solving these problems

Attendance requirements(%):

Teaching arrangement and method of instruction:

## Course/Module Content:

1. Review of basic (deterministic) first and second-order methods

- 2. Interior point methods
- 3. Stochastic and online optimization in Machine Learning
- 4. Optimization in the distributed setting

Required Reading:

<u>Additional Reading Material:</u> Will be provided

<u>Course/Module evaluation:</u> End of year written/oral examination 70 % Presentation 0 % Participation in Tutorials 0 % Project work 0 % Assignments 30 % Reports 0 % Research project 0 % Quizzes 0 % Other 0 %

Additional information: